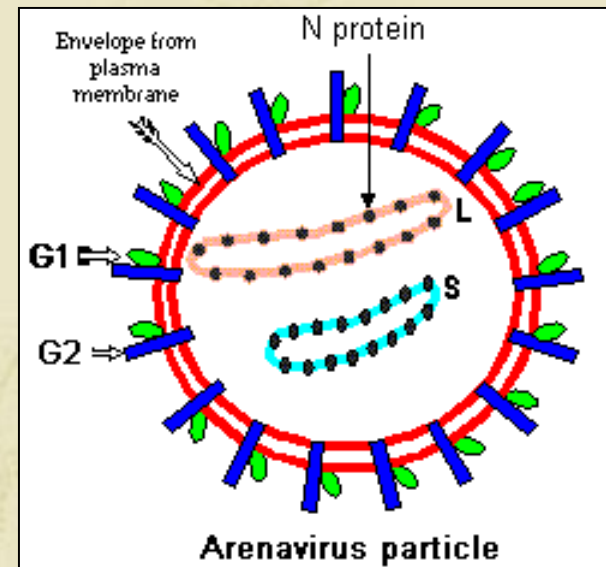




# ***Medical NBC Briefing Series***

## ***Medical NBC Aspects of***

# ***Lassa***



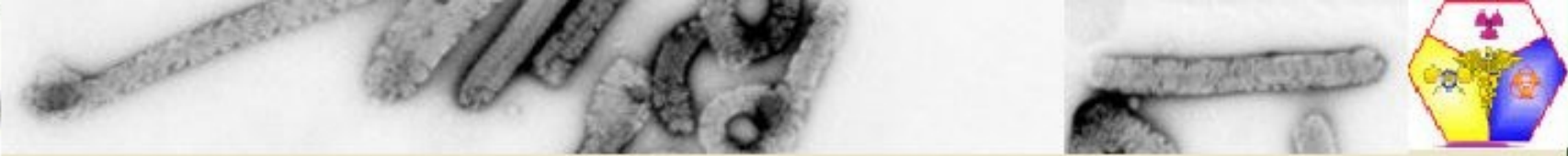


# Purpose

- *This presentation is part of a series developed by the Medical NBC Staff at The U.S. Army Office of The Surgeon General.*
- *The information presented addresses medical issues, both operational and clinical, of various NBC agents.*
- *These presentations were developed for the medical NBC officer to use in briefing either medical or maneuver commanders.*
- *Information in the presentations includes physical data of the agent, signs and symptoms, means of dispersion, treatment for the agent, medical resources required, issues about investigational new drugs or vaccines, and epidemiology.*
- *Notes page.*

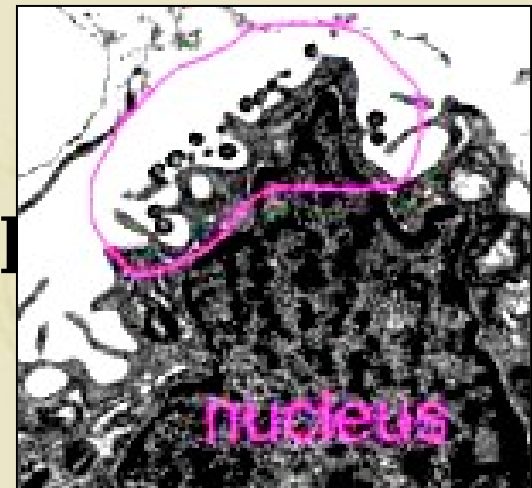


Office of the Surgeon General  
for the Army



# Outline

- **Background**
- **Battlefield Response**
- **Medical Response**
- **Command and Control**
- **Summary**
- **References**





# Background

- **Disease Background**
- **History**
- **Disease Course Summary**
- **Signs and Symptoms**
- **Diagnosis**
- **Treatment**
- **Current Situation**
- **Weaponization**

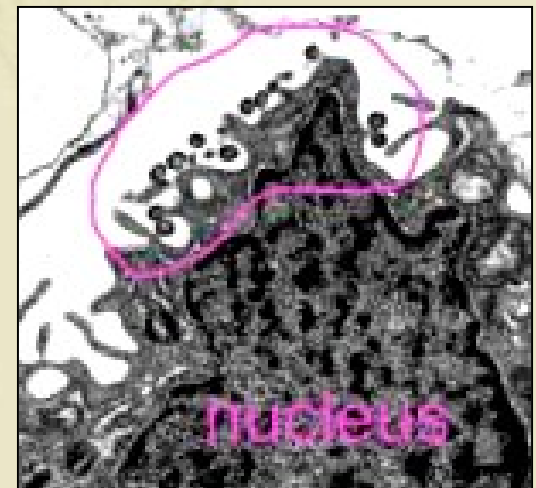






# Disease Background

- **RNA viruses - Arenaviridae**
- **Lassa discovered in 1969**
- **15-50 case mortality rate**  
**Epidemic noted in 1996 in Africa**
- **Spread by the multimammate rat and human to human contact**





# History

- Lassa discovered in 1969
  - 15-50 case mortality rate
- Epidemic noted in 1996 in Africa**





# Lassa Disease Course Summary In Untreated Individuals

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
<b>EXPOSUR E</b>						
Incubation 6-21 Days						
Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14
fever, chest pain, sore throat, back pain, vomiting, facial swelling, stomach pain, diarrhea						
Incubation 6-21 Days						
Day 15	Day 16	Day 17	Day 18	Day 19	Day 20	Day 21
Severe low blood pressure, shock, hemorrhage, seizures, swelling-- →DEATH						
Incubation 6-21 Days						
Day 22	Day 23	Day 24	Day 25	Day 26	Day 27	Day 28





# Signs and Symptoms - Lassa

- 6-21 day incubation period
- Subtle onset of sore throat, chills/shivering, headache, muscle aches and pain, severe exhaustion, fluid retention (edema) and malaise
- Other symptoms are bleeding from the gums and nose, severe exhaustion, and flushing of the face and chest







# Signs and Symptoms - Lassa

- **Second week:**
  - face and neck swelling
  - Vomiting and diarrhea
  - Cough
  - Dizziness
  - Abdominal pain
  - Severely bloodshot eyes
  - Renal failure resulting in death
- **Deafness may occur in recovered patients**





# Diagnosis - Clinical

- Large numbers of individuals in the same geographic area presenting over a short time span
- Acute onset of symptoms
- Early diagnosis is a key for recovery



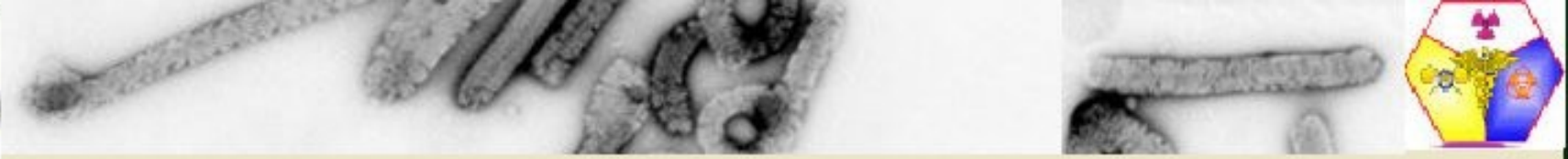


# Diagnosis - Laboratory

- **Blood, urine, and throat washings**
- **Requires maximum biosafety laboratory**
- **Handling specimens should be with extreme caution and special collection and handling methods must be used**







# Treatment

- **Quarantine of known cases**
- **Ribavirin by IV 30mg/kg initially, followed by 15mg/kg every 6 hours for 4 days and 8 mg/kg every 8 hours for 6 additional days**
- **Supportive care - substantial medical supportive may be required**
  - Intensive care unit facilities
  - Oxygen
  - Hydration (IV therapy)
  - Ventilation support for severe cases
  - Pain management





# Current Situation

- **Currently endemic in West Africa**
- **As a biological warfare agent, Lassa poses a significant threat to ground troops**
  - Highly transmissible
  - Infectious
  - Lethal
  - Easily dispersible to ground troops as an aerosol
  - Stable in the environment
- **International deployments of US troops**
- **Risk of importation/exportation of disease**



# Weaponization

- **Aerosolization**
  - Inhalation threat
  - Delivery systems can be s
    - Spray systems
    - Sub munitions
    - Detonation containers
    - Crop duster or boat
    - Bomblets
    - Aircraft







# Battlefield Response to Lassa

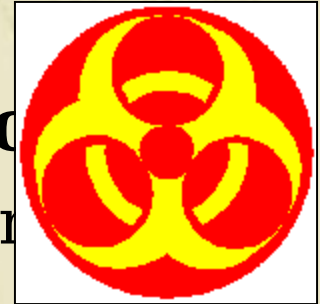
- **Detect**
- **Protect**
  - Individual protection
  - Collective protection





# Detection

- **Possible methods of detection**
  - Detection of agent in the environment
  - Clinical (differential diagnosis)
  - Medical surveillance (coordination enhances detection capability)
- **Diagnosis of Lassa is not presumptive of a BW attack - the disease may be endemic to the area**





# Detection of Agent in the Environment

- Biological Smart Tickets
- Enzyme Linked Immunosorbant Assay (ELISA) (Fielded with the 520th TAML)
- Polymerase Chain Reaction (PCR) (Fielded with the 520th TAML)







# Detection of Agent in the Environment (cont.)

- M31E1 Biological Integrated Detection System (BIDS)
- Interim Biological Agent Detector (IBAD)





# Clinical Detection

## Sudden presentation of

- High fevers, back pain, and an extremely sore throat presenting in groups
- Rapid progression of symptoms





# Laboratory Confirmation

- **Division medical assets lack lab equipment to conduct test to determine hemorrhagic fevers**
- **Specimen must be sent to theater level or CONUS lab**
  - Unit SOP's for collection
  - Safety precautions
- **Lab specimens should be submitted to the correct diagnostic laboratory**
- **Contact lab prior to collection or preparation in order to assure proper**





# Laboratory Confirmation (cont.)

## Points of contact for biological sampling and shipping

- Corps Chemical Officer
- Technical Escort Unit
- AFMIC
- 520th TAML
- USAMRIID
- WRAIR
- CDC





# Medical Surveillance



MARYLAND ARMY NATIONAL GUARD  
DISCOM 29<sup>th</sup> Infantry Division (Light)  
DIVISION MEDICAL OPERATION CENTER (DMOC)



## Patient Summary Report 29<sup>th</sup> INF (L) DIV

From: Division Medical Operations Center (DMOC)  
To: Division Surgeon

Date Time Group: From: 121200RJUN99  
To: 202400RJUN99

### PATIENTS

Nation	WIA	NBI	Disease	Neuropsychiatric Stress-Related	Total
US	0	97	55	0	152
Allied	0	0	0	0	0
EPW	0	0	0	0	0

### DISPOSITION

Return to duty	148
Holding in Division's MTFs	0
Evacuated and returned	3
Evacuated by air	0
Evacuated by ground	1
Expired en route	0
Expired in MTF	0

Clues in the daily medical disposition reports of a BW Attack

- Simultaneous presentations of large numbers of infected
- Natural outbreaks would have an index case and the numbers would build



# Individual Protection

- Mask and BDO with gloves and boots.
- Standard uniform clothing affords a reasonable protection against dermal exposure to biological agents
- Casualties unable to wear MOPP should be handled in casualty wraps







# Collective Protection

- Hardened or unhardened shelter equipped with an air filtration unit providing overpressure
- Standard universal precautions should be employed as individuals are brought inside the collective protection units
- Lassa is communicable from person to person
- Contaminated articles can be decontaminated using 0.05%





# Medical Response to Lassa

- Triage and Evacuation
- Evacuation or Quarantine
- Infection Control
- Resource Requirements





# Triage and Evacuation

- **Triage**
  - Priorities based on severity of symptoms
  - Respiratory support, ICU needs, and quarantine facilities will increase priorities
- **Evacuation -Immediate**
  - Considerable infection control precautions during transport
  - Must consider quarantine in place in a mass casualty situation
  - Evacuation of patients will be METT-T dependent





# Evacuation or Quarantine

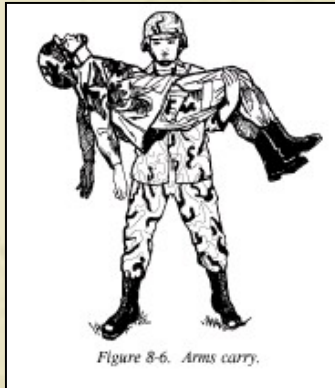


Figure 8-6. Arms carry.

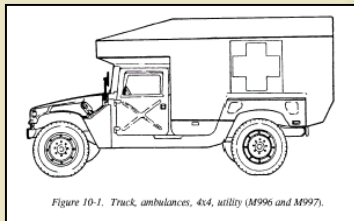


Figure 10-1. Truck, ambulances, div4, utility (M996 and M997).

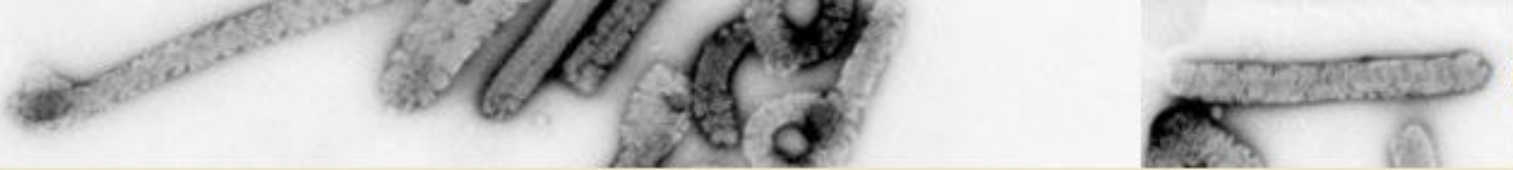
- Lassa patients not likely to RTD in the normal theater evacuation policy of 15 days
- Strict interpretation of the doctrine calls for evacuation

- **Quarantine**

- Contagious
- Limit spread of the virus
- Unlike smallpox, Lassa is already endemic to various parts of the world

- **Guidance**

- Before evacuating patients suspected of Lassa, seek guidance from the CINCPAC and the MTF Commander.



# Infection Control

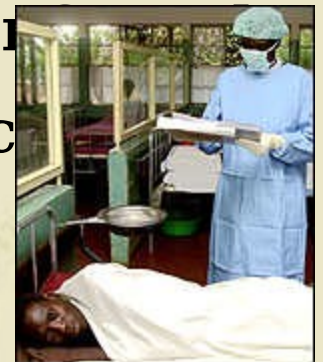
- **Communicable from person to person**
- **Single room with adjoining anteroom as only entrance**
  - Hand washing facility with decontamination solution
- **Negative air pressure if possible**
- **Strict barrier precautions**
  - gloves, gown, mask, shoe covers, protective eyewear/face shield
  - consider HEPA respirator for prominent hemorrhage, vomiting, diarrhea, cough
- **Patient remains - Quartermaster section**
  - Decontamination, embalming, transportation in hermetically sealed containers

DOXYCYCLINE



# Infection Control (cont)

- Chemical toilet
- All body fluids disinfected
- Disposable equipment / sharps in rigid containers and autoclaved /incinerated
- Double-bag refuse-outside bag disinfectant
- Electronic/mechanical equipment cleaned with paraformaldehyde disinfected



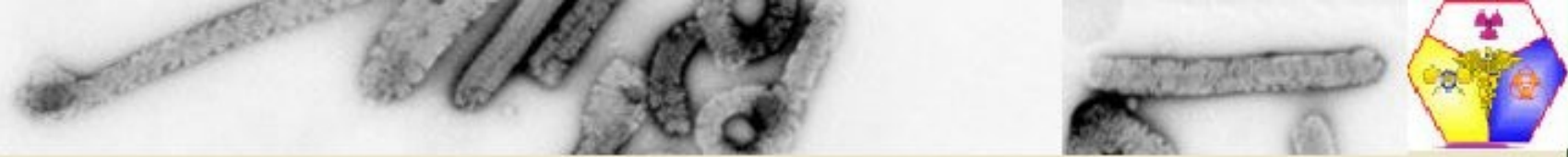




# Resource Requirements

- **Specialized evacuation assets**
- **Isolation facilities**
- **Ribavirin**
- **Supportive therapies**
  - Vigorous IV therapy
- **Intensive care facilities**
- **Possibility for quarantine of mass amounts of compromised patients**
- **Specialized infection control equipment for care providers**
- **Quarantine, if imposed, would strain the supply chains**





# Command and Control

- **Intelligence**
  - Medical surveillance and intelligence reports are key to keep the Command alert to the situation
- **Evacuation of the sick or Quarantine**
- **Maneuver**
  - Quarantine or isolation is required of symptomatic patients
- **Logistics**
  - Additional Class VIII materials will be required and evacuation routes to Echelon III will be heavily utilized
  - Specialized evacuation assets may be required
- **Manpower**
  - Many soldiers may be affected by aerosol dissemination in a short period of time



# **Command and Control Response to Psychological Impact**

- **May vary from person to person**
- **Psychological Operations**
  - Rumors, panic, misinformation
  - Soldiers may isolate themselves in fear of disease spread
- **Countermeasures**
  - LEADERSHIP is responsible for countering psychological impacts through education and training of the soldiers
  - Implementation of defensive measures such as crisis stress management teams





# Summary

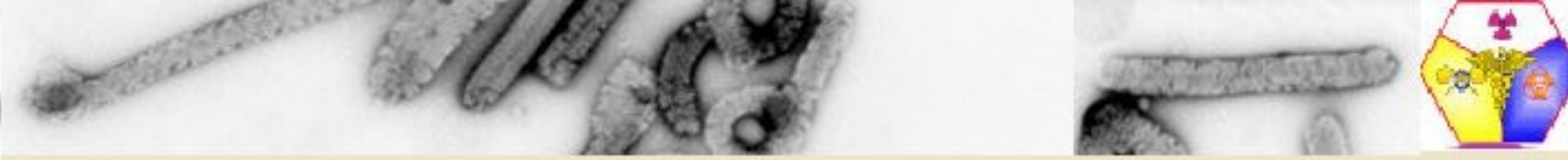
- **Lassa virus is highly infectious when aerosolized**
- **The possibility for weaponization is highly probable**
- **Detection may not occur until after exposure when patients are reported**
- **Command decisions that will be required upon detection of Lassa:**
  - Evacuation or Quarantine?
  - Evacuation: Many patients will be presenting at one time. Methods of evacuation?
  - Treatment: Procurement of additional antiviral and antibiotics, equipment? Isolation of affected troops?



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